

Title (en)  
Laminate of metal sheets and continuous filaments-reinforced thermoplastic synthetic material, as well as a process for the manufacture of such a laminate.

Title (de)  
Schichtstoff aus Metallschichten und aus durchgehendem,faserverstärkten,synthetischen,thermoplastischen Material und Verfahren zu seiner Herstellung.

Title (fr)  
Laminé en couches de métal et de matière thermoplastique synthétique renforcée par des filaments continus et son procédé de fabrication.

Publication  
**EP 0312150 A1 19890419 (EN)**

Application  
**EP 88202178 A 19881003**

Priority  
NL 8702452 A 19871014

Abstract (en)  
Fatigue resistant laminate which may be used at temperatures > 120 DEG C, and more particularly in the construction of (air or space) vehicles. It comprises at least two metal plates (2) interconnected by an intermediate layer (3) of thermoplastic material reinforced by continuous filaments (4) having a modulus of elasticity of at least 50 GPa, the laminate displaying, while externally unloaded, a compressive stress (of 0-200 MPa) in every metal plate and a tensile stress (of 0-500 MPa) in the continuous filaments. The filaments may consist of aramid, glass or carbon. The thermoplastic material may be an amorphous resin having a Tg > 140 DEG C such as, e.g., polyarylates, poly(ether)sulphones, polyetherimides, or poly-p-phenylene ethers, or a semi- or para-crystalline resin having a crystalline melting point > 170 DEG C, such as poly-phenylene sulphides, polyetherketones or liquid crystal polymers.

IPC 1-7  
**B32B 15/08**; **B64C 1/00**; **B64G 1/00**

IPC 8 full level  
**B32B 15/02** (2006.01); **B32B 15/08** (2006.01); **B64C 1/00** (2006.01); **B64G 1/00** (2006.01)

CPC (source: EP US)  
**B32B 15/08** (2013.01 - EP US); **B32B 15/18** (2013.01 - US); **B32B 15/20** (2013.01 - US); **B32B 2262/0269** (2013.01 - US); **B32B 2307/54** (2013.01 - US); **B32B 2605/18** (2013.01 - US); **Y10T 428/24967** (2015.01 - EP US); **Y10T 428/31533** (2015.04 - EP US); **Y10T 428/31678** (2015.04 - EP US); **Y10T 428/31681** (2015.04 - EP US); **Y10T 428/31721** (2015.04 - EP US); **Y10T 428/31725** (2015.04 - EP US); **Y10T 442/602** (2015.04 - EP US); **Y10T 442/643** (2015.04 - EP US); **Y10T 442/644** (2015.04 - EP US); **Y10T 442/656** (2015.04 - EP US)

Citation (search report)  
• [YD] EP 0056288 A1 19820721 - DELFT TECH HOGESCHOOL [NL]  
• [YD] EP 0237095 A1 19870916 - AKZO NV [NL]  
• [AD] GB 2178364 A 19870211 - SMITH H R  
• [AD] EP 0050855 A1 19820505 - HITACHI CHEMICAL CO LTD [JP], et al

Cited by  
JP2007191148A; WO2007145512A1; EP1793989A4; NL1030066C2; NL2007683C2; NL2000100C2; NL1030515C2; NL1014112C2; KR100692791B1; EP0372505A3; EP1876013A3; EP1415799A1; EP0783960A3; EP1614531A3; WO2004028798A1; US9919495B2; WO0153072A3; WO2017080841A1; WO2007037695A1; WO2013066173A1; US6841252B2; DE102016121267A1; US7192501B2; DE102008062860A1; DE102012218711A1; US6736919B1; US7955713B2; WO2007061304A1; JP2010132286A

Designated contracting state (EPC)  
AT BE CH DE ES FR GB GR IT LI LU NL SE

DOCDB simple family (publication)  
**EP 0312150 A1 19890419**; **EP 0312150 B1 19921202**; AT E82903 T1 19921215; CA 1306934 C 19920901; DE 3876371 D1 19930114; DE 3876371 T2 19930513; JP 2704737 B2 19980126; JP H01136737 A 19890530; US 4992323 A 19910212

DOCDB simple family (application)  
**EP 88202178 A 19881003**; AT 88202178 T 19881003; CA 580023 A 19881013; DE 3876371 T 19881003; JP 25743188 A 19881014; US 25543288 A 19881011